

REMARKS

Claims 1, 6, 7, 9, 10, 14 and 15 have been amended and claims 8 and 10 have been deleted, to more distinctly claim Applicants' invention. No new matter has been introduced.

THE REJECTIONS

(1) The Examiner has rejected claims 1-14 under 35 U.S.C. 103(a) as being unpatentable over "Epolene Polymers" (publication WA-5E, November 2002, Eastman Chemical Company) taken with evidentiary reference "Epolene Waxes" (publication F-301E, December 1996, Eastman Chemical Company). The Examiner cites the maleated polyolefins C-16, C-18, and E-43 in Epolene Polymers in support of the rejection. This rejection is respectfully traversed.

The present invention as presently amended relates to a composite material comprising mixing at least one natural fiber, at least one polypropylene resin, and at least one functionalized polypropylene coupling agent to provide said composite material; wherein said functionalized polypropylene coupling agent possesses a molecular weight distribution of greater than 2.5 (M_w/M_n by GPC) and comprises a base polypropylene resin that is grafted with a total of more than about 1 mmole of at least one polar monomer per 100 grams of functionalized polypropylene coupling agent, and a process for preparing the composite material. Applicants have demonstrated the unexpected advantage of using a polypropylene coupling agent which has a molecular weight distribution of greater than 2.5 (M_w/M_n by GPC). See Examples, beginning on page 10 of the specification.

Neither Epolene Polymers nor Epolene Waxes teaches or suggests that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in natural fiber composite material. C-16 and C-18 are maleated polyethylenes and E-43 has a MWD of 2.3. Accordingly, the ordinary person skilled in the art would not have been lead to Applicant's claimed invention based on the description in Epolene Polymers or Epolene Waxes, alone or in combination. Reconsideration of the rejection of claims

1-14 under 35 U.S.C. 103(a) as being unpatentable over Epolene Polymers taken with evidentiary reference Epolene Waxes, is respectfully requested.

(2) The Examiner has rejected claim 15 under 35 USC 103(a) as being unpatentable over Epolene Polymers taken with evidentiary reference Epolene Waxes and further in view of Wolcott et al. This rejection is respectfully traversed.

Applicants' claimed invention in claim 15 relates to a natural fiber composite material comprising at least one polypropylene resin, at least one functionalized polypropylene coupling agent, and at least one lubricant selected from the group consisting of fatty acid amides and fatty acid esters; wherein the functionalized polypropylene coupling agent possesses a molecular weight distribution of greater than 2.5.

The deficiencies of the Epolene Polymers and Epolene Waxes has been discussed above, i.e., neither reference, alone or in combination, teach or suggest that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in natural fiber composite material..

Wolcott et al describe the use of certain waxes (Zn-stearate, EBS, OP-100) in certain wood composite materials comprising polypropylene or polyethylene. Wolcott et al do not teach or suggest that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in the wood composite material.

Furthermore, the coupling agents useful in Applicants' claimed invention show surprisingly superior performance in lubricated systems. For example, compare the formulation containing the 2% of the coupling agent of this invention and 3% of the fatty acid amide ethylene bis-stearamide (Example 28 in Table 5 of the present specification) with the Wolcott et al sample containing 2% of MA-PP wax and 1% of ethylene bis-stearamide (2nd from bottom in Table 3). Compared to controls that did not contain either coupling agent or lubricant, the sample of the present invention showed a 37% increase in flexural strength versus only a 12% increase for the Wolcott et al sample.

Accordingly, none of Wolcott et al, Epolene Polymers, or Epolene Waxes teaches or suggests that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in lubricated natural fiber composite material. Accordingly, the ordinary person skilled in the art would not have been lead to Applicant's claimed invention based on the descriptions in Wolcott et al, Epolene Polymers or Epolene Waxes, alone or in combination. Reconsideration of the rejection of claim 15 under 35 U.S.C. 103(a) as being unpatentable over Epolene Polymers taken with evidentiary reference Epolene Waxes and further in view of Wolcott et al, is respectfully requested.

(3) The Examiner has rejected claims 1-14 under 35 U.S.C. 103(a) as being unpatentable over Godavarti et al (USPN 6,265,037 B1) in view of Epolene Polymers taken with evidentiary reference Epolene Waxes. This rejection is respectfully traversed.

Applicants' invention in claims 1-14 has been discussed above. The deficiencies of Epolene Polymers and Epolene Waxes have also been discussed above.

Godavarti et al describe certain polyolefin wood fiber composite materials useful for structural members. Godavarti et al do not teach or suggest that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in the wood fiber composite material. The maleated polypropylene coupling agents used in Godavarti et al for which there are MW and functionality data are Epolene E-43, G-3003, and G-3015. E-43 has MWD of 2.3. G-3003 and G-3015 each has a MWD of 1.9.

Accordingly, none of Godavarti et al, Epolene Polymers, or Epolene Waxes teaches or suggests that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in wood fiber composite material. Accordingly, the ordinary person skilled in the art would not have been lead to Applicant's claimed invention based on the descriptions in Godavarti et al, Epolene Polymers or Epolene Waxes, alone or in combination. Reconsideration of the rejection of claims 1-14 under 35 U.S.C. 103(a) as being unpatentable over Godavarti et al in view of Epolene Polymers taken with evidentiary reference Epolene Waxes, is respectfully requested.

(4) The Examiner has rejected claim 15 under 35 USC 103(a) as being unpatentable over Godavarti et al in view of Epolene Polymers taken with evidentiary reference Epolene Waxes and further in view of Wolcott et al. This rejection is respectfully traversed.

Applicants' invention in claim 15 has been discussed above.

The deficiencies of all of the references Godavarti et al, Epolene Polymers, Epolene Waxes, and Wolcott et al, have been discussed above.

None of Godavarti et al, Wolcott et al, Epolene Polymers, or Epolene Waxes teaches or suggests that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in lubricated natural fiber composite material. Accordingly, the ordinary person skilled in the art would not have been lead to Applicant's claimed invention based on the descriptions in Godavarti et al, Wolcott et al, Epolene Polymers or Epolene Waxes, alone or in combination. Reconsideration of the rejection of claim 15 under 35 U.S.C. 103(a) as being unpatentable over Godavarti et al, in view of Epolene Polymers taken with evidentiary reference Epolene Waxes and further in view of Wolcott et al, is respectfully requested.

(5) The Examiner has rejected claims 1-14 under 35 USC 102(b) as anticipated by Sigworth et al. This rejection is respectfully traversed.

Applicants invention has been discussed above.

Sigworth et al describe the use of certain maleic anhydride grafted HDPE and polypropylene in plastic composites containing natural products such as wood flour. Sigworth et al do not teach or suggest that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in a natural fiber composite material. Polybond 3009 and 3109 are maleated polyethylenes.

Accordingly, reconsideration of the rejection of claims 1-14 under 35 U.S.C. 102(a) as

anticipated by Sigworth et al, is respectfully requested.



(6) The Examiner has rejected claim 15 under 35 USC 103(a) as being unpatentable over Sigworth et al in view of Wolcott et al. This rejection is respectfully traversed.

Applicants' invention in claim 15 has been discussed above.

The deficiencies of Sigworth et al and Wolcott et al, have been discussed above.

Neither of Sigworth et al nor Wolcott et al teaches or suggests that a functionalized polypropylene coupling agent that possesses a molecular weight distribution of greater than 2.5, should or could be used in lubricated natural fiber composite material. Accordingly, the ordinary person skilled in the art would not have been lead to Applicant's claimed invention based on the descriptions in Sigworth et al or Wolcott et al, alone or in combination. Reconsideration of the rejection of claim 15 under 35 U.S.C. 103(a) as being unpatentable over Sigworth et al in view of Wolcott et al, is respectfully requested.

In light of the foregoing, reconsideration and allowance of the subject application are respectfully solicited.

Respectfully submitted,

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